ADVANCED FUNCTIONAL MATERIALS

Supporting Information

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A Facile and General Method for the Encapsulation of Different Types of Imaging Contrast Agents Within Micrometer-Sized Polymer Beads

*Meng-Yi Bai, Christine H. Moran, Lei Zhang , Changjun Liu, Yu Zhang, Lihong V. Wang, and Younan Xia**

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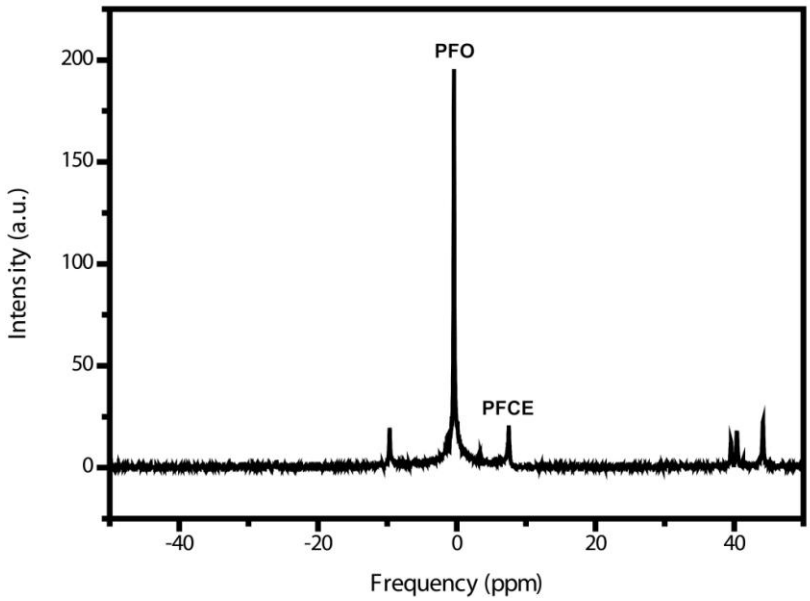
Quantitative analyses for estimating the amount of PFO encapsulated inside the core of PS hollow particles.

Control experiment for quantitative analysis: 5.0 μL PFO + 2.0 μL PFCE

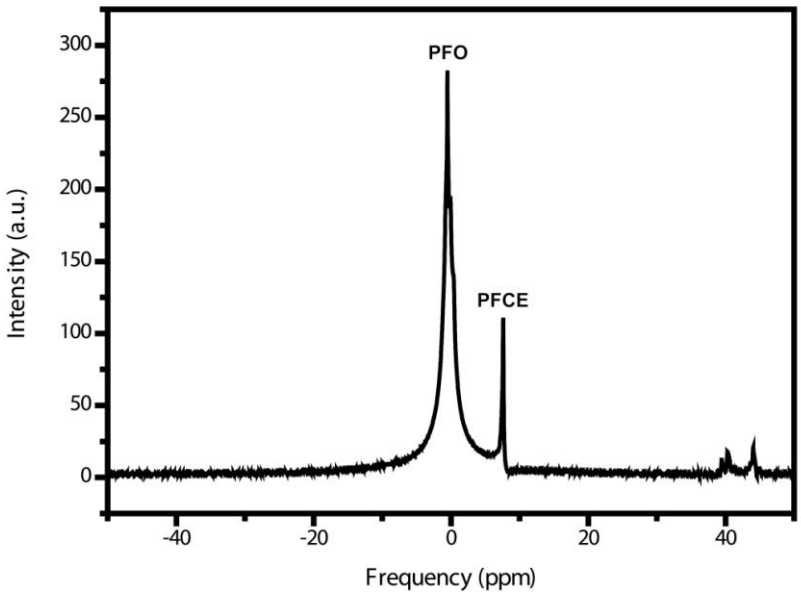


A_{PFO}/A_{CE} = 5.72, where A_{PFO} and A_{CE} are the areas under the respective peaks.

V_{PFO}/V_{CE} = 5.0/2.0 = A_{PFO}/A_{CE} × k= 5.72k, where V_{PFO} and V_{CE} are the volumes added, and where k is a constant relating the peak area ratio to the volume ratio.

→k= 0.437.

Experiment (1) for PFO-encapsulated PS particles: ***x*** µL PFO + 10 µL PFCE



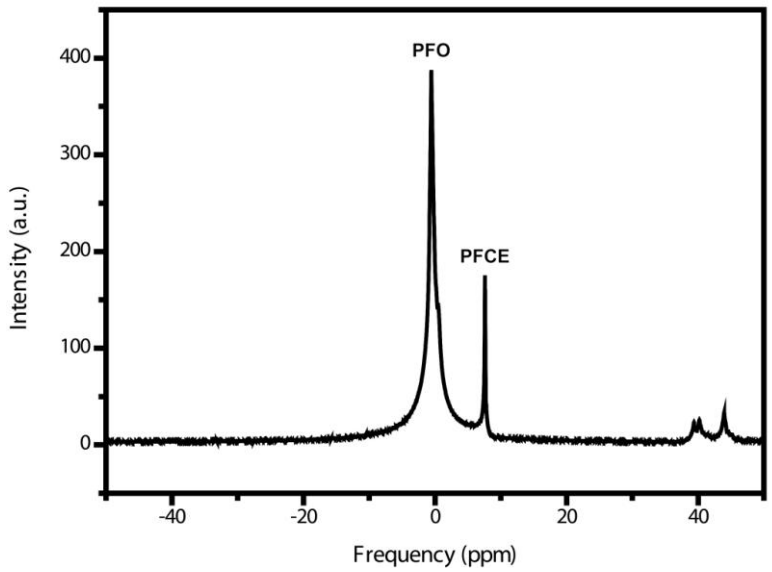
$\boldsymbol{x}/10 = A_{PFO}/A_{CE} \times k$, where ***x*** is the total volume of PFO encapsulated, and the constant k=0.437.

According to the peak integration from the spectrum, we know that $A_{PFO}/A_{CE} = 7.742$.

$\boldsymbol{x}/10 = 7.742 \times 0.437$

$\boldsymbol{x} = 7.742 \times 0.437 \times 10 = 33.8$ µL

Experiment (2) for PFO-encapsulated PS particles: ***x*** μL PFO + 10 μL PFCE



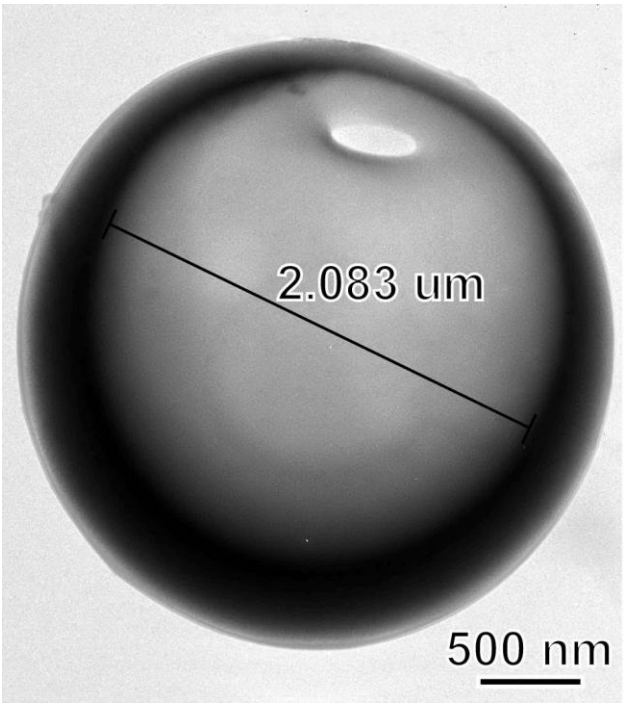
$\boldsymbol{x}/10 = A_{PFO}/A_{CE} \times k$

According to the peak integration from the spectrum, we know that $A_{PFO}/A_{CE} = 7.831$

$\boldsymbol{x}/10 = 7.831 \times 0.437$

$\boldsymbol{x} = 7.831 \times 0.437 \times 10 = 34.2$ μL

Figure S1. MR quantitative analyses for estimating the amount of PFO encapsulated inside the core of PS hollow particles.



PS stock solution: ~2.5 g /100 mL, 4.6×10^{10} particles/mL

Weight of starting PS hollow beads = 0.0038 g

Total number of PS beads used for loading = $(0.0038/0.025)\times4.6\times10^{10} = 7.0\times10^{9}$ beads

Inner volume of a PS hollow bead = $(4/3)\pi r^3 = (4/3)\times3.14\times(1.04\times10^{-6}\ m)^3$

$= 4.7\times10^{-18}\ m^3$/particle

Total inner volume of the hollow PS beads available for loading =

7.0×10^{9} particles$\times4.7\times10^{-18}\ m^3$/particle

$= 3.3\times10^{-8}\ m^3$

= 33 μL (theoretical value)

Figure S2. Theoretical calculation of the total inner volume provided by a batch of PS hollow beads for PFO encapsulation.